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Center for Manufacturing Excellence announced for School of Engineering

A new partnership at The University of Mississippi aims to keep jobs at home by educating the nation's future manufacturing professionals.

The university, the state of Mississippi and Toyota Motor Corp. are joining to create the Center for Manufacturing Excellence, which will feature a unique undergraduate engineering curriculum. The center will offer students not only degrees in engineering with an emphasis in manufacturing but also strong cross-disciplinary studies that reflect other skills needed in engineering and the sciences, including business, management, accounting, leadership and human resources.

The $22 million center is being funded through part of a state incentive package that helped attract Toyota to Blue Springs, where the company is building a $1.3 billion automotive manufacturing plant. When production begins in 2010, the plant is expected to employ about 2,000 workers to build the Prius. The popular hybrid is currently built only in Asia.

"This center will be a perfect blend of the academic and real-world focus so essential today for success in the multifaceted global manufacturing sector," Gov. Haley Barbour said at a news conference announcing the center. "Under terms of the enabling legislation, the center will work closely with the state's manufacturing companies to improve their competitiveness in all areas of manufacturing. My expectation is that students who complete this intensive program will become industry leaders in every phase of many different businesses."

One floor of the planned 47,000-square-foot center will house a small factory floor complete with different process lines, said James Vaughan, interim director of the Center for Manufacturing Excellence. In addition to classrooms, laboratories and student work spaces, the building will have office space for the center's new faculty members, as well as room for visiting faculty and a visiting Toyota executive-in-residence.

As a component of the center, the university is developing a program emphasizing instruction in manufacturing slanted toward lean manufacturing that will be applicable to all Mississippi manufacturing industries.

The School of Engineering also plans to offer a bachelor's degree in

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photo by Robert Jordan

Jim Vaughan

Instead of his normal column, I am pleased that Dean Lee has given me the opportunity to write about a subject of extreme importance for the school, the university and the state of Mississippi. On June 23, 2008, Gov. Haley Barbour and Chancellor Robert Khayat, joined by Dennis Cuneo representing Toyota, jointly announced the establishment of the Center for Manufacturing Excellence (CME) at the university.

The vision for the CME is a unique blend of engineering, business, marketing and accountancy that will produce students ready to contribute to the manufacturing industries in the state and nation. To our knowledge, such a special blend of undergraduate educational opportunities across multiple schools does not exist anywhere else in the country.

The CME has the potential to transform the School of Engineering and the university into a major force in the economic well-being of the state of Mississippi and the nation. In Mississippi, the percentage of the working population employed in the manufacturing sector exceeds the national average. Mississippians work in a variety of industries including furniture manufacturing in north Mississippi, the Nissan-related automotive industry in the central portion of the state, shipbuilding along the coast and a rapidly growing aviation/aerospace industry throughout the state. With the addition of the new Toyota assembly plant in Blue Springs, along with its major suppliers and a major engine plant near Columbus, Mississippi is rapidly rising as a leader in the automotive industry.

The time is right to focus on educating students to work in the manufacturing industry, and Mississippi industry is ready to offer support. Mississippi Power has established a $500,000 endowment for the CME, and the Hearin Foundation has funded a $750,000 grant to develop a new co-op program concept for the CME. At the invitation of the governor and chancellor, leaders of major industries in Mississippi are signing on to serve on the CME advisory board.

New academic programs within the School of Engineering include an emphasis in manufacturing offered as an option to the Bachelor of Science in Mechanical Engineering degree. In addition, a new option will be added to the present Bachelor of Engineering degree allowing students interested in manufacturing to take 33 credit hours concentrated in manufacturing and business courses. The School of Engineering also will offer minors to business and accounting students who wish to work in the manufacturing industry. We are currently working to develop the curriculum for all of these programs and expect to enroll our first entering freshman class in fall 2009.

The CME will also focus on outreach activities and an extension service to Mississippi companies to help them become better lean manufacturers. The CME will work closely with K-12 educational programs and the community colleges to ensure maximum student involvement at all levels. More activities than can be described within this space are also planned, so please visit the Web site at www.olemiss.edu/cme to see all that is planned.

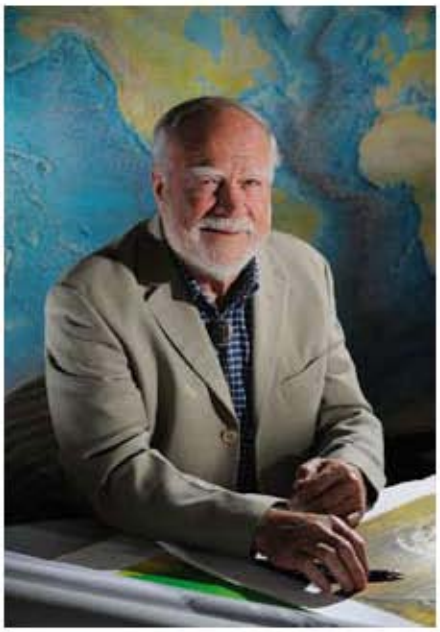
The CME will be housed in a new 47,000-square-foot building to be built in the space now occupied by the parking lot between Carrier Hall and Old Chemistry. It will consist of three floors with most of the lower floor dedicated to a 12,000-square-foot mini factory floor. As a part of the construction of the CME, Carrier Hall will also get a face-lift with a much-needed ADA renovation to the entrance area; Old Chemistry is also under renovation. This new Engineering Complex, consisting of Carrier Hall, Old Chemistry and the new CME building, will bring about a major change for engineering at Ole Miss.

Plans for the CME are continuously being refined. If you have comments for us to consider, please call or e-mail. I am extremely excited about the opportunities the CME offers, and I would like to talk to you about this most important new venture for the school and the university.

Jim Vaughan, Interim Director of the Center for Manufacturing Excellence
662-915-5378, mejgv@olemiss.edu

MMRI director remembered as 'exceptional' researcher

photo by Robert Jordan



James Woolsey served as director of the Mississippi Mineral Resources Institute since 1982.

James Robert Woolsey, 72, director of the Mississippi Mineral Resources Institute at The University of Mississippi, died July 9 in an auto accident near Batesville.

A renowned geologist and expert in undersea minerals resources, Woolsey led efforts to establish a gas hydrate monitoring station on the floor of the Gulf of Mexico. The Savannah, Ga., native had served as MMRI director since 1982 and also was director of the university's Center for Marine Resources and Environmental Technology and the Seabed Technology Research Center.

"Bob Woolsey was an exceptional researcher and administrator, and his vision helped focus MMRI's mission and attract support from government and private industry," Chancellor Robert Khayat said. "He brought together the best minds in the world to explore Mississippi's mineral resources, and his work to develop those resources responsibly will benefit the people of this state for generations."

Woolsey's research has included projects to develop better underwater drills, search for mineral resources on the ocean floor, and develop oil and gas reserves. His primary work over the past decade involved studies of gas hydrates, formed when hydrocarbon gases blend with seawater and freeze beneath the sea floor, with the goal to develop them as a major energy source.

Woolsey served on Gov. Haley Barbour's Energy Task Force and was appointed to serve on the Center for Legislative Energy and Environmental Research's (CLEER) University Advisory Board. CLEER is an affiliate of the Energy Council based in Dallas. Woolsey was a member of the U.S. Department of Energy's Methane Hydrate Advisory Committee, and he represented Mississippi on the Outer Continental Shelf Policy Committee for advising the U.S. Department of Interior.

"Dr. Woolsey was a bright and enthusiastic researcher," U.S. Sen. Thad Cochran said. "His tireless work on behalf of Mississippi Minerals Resources Institute and the Department of Interior brought notoriety to The University of Mississippi. He will be missed by the scientific community and the Ole Miss family, but his legacy and work will be enduring reminders of his contributions to our state and nation."

Woolsey helped organize an international consortium of scientists and engineers to study hydrates in the Gulf of Mexico and hosted several conferences on the work at Ole Miss. More recently, he helped guide efforts to produce biodiesel from cooking oil and other plant sources to power MMRI's equipment and vehicles.

"He had an extraordinary ability in bringing people together to address important problems," said Alice Clark, UM vice chancellor for research and sponsored programs. "It was obvious to all who knew him that he loved his work and the people he worked with. He was a delightful man who will be deeply missed."

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In Memoriam

The following School of Engineering alumni died this year:

- Robert Edward Adams (MS 56)
- Randall W. Eckert (BSCE 80)
- Gregory Gomez IV (BSME 08)
- Marion M. Hambrick (BSChE 36)
- Billy J. Logan Jr. (BSCE 68)
- William R. Moorman (BSChE 58)
- Harlan E. Northcott (BA 51)
- Ronnie Spencer Roberts (BSChE 66)
- Glen Everett Torrey (BSME 62)
- Gerald L. Tucker (BSChE 63, MS 64)
- James R. Woolsey Jr., MMRI director and research professor

Discovery Zone

Visiting high-school students see Ackerman mine and power plant

As fictional archaeologist Indiana Jones unearthed magnificent discoveries on the silver screen this summer, high-school students visiting The University of Mississippi found a similar real-life treasure trove just hours from campus.

The seven visiting students—enrolled in Engineering 100 as part the Summer College for High-School Students program—along with three Ole Miss engineering students and three staff members, made their discovery on a field trip to the Red Hills Mine and Power Plant, an affiliate of North American Coal Corp., located near Ackerman.

Members of the group were amazed with the coal refinery process, which supplies electricity to the Tennessee Valley Authority.

"This was a fantastic experience," said Maxine Woolsey, educational outreach specialist in the School of Engineering and coordinator of Engineering 100. "The students were allowed to see how all disciplines of engineering operate together to provide electrical power to thousands of north Mississippi households on a daily basis."

During the outing, the students learned about the history of the 10-year-old mine. They also witnessed how the lignite is uncovered, shoveled into dump trucks, then deposited into areas where it is crushed and transported to the power plant to be transformed into electricity.

"Watching the whole mining process from beginning to end was very interesting," said Michael Huber, a student from Blackmon High School in Murfreesboro, Tenn. "The power plant has many floors, boilers, turbines and other heavy equipment. It was fun to watch."

"It was truly amazing to see how all that coal goes into a relatively small machine that transfers so much energy," said Nathan Flippo of Shoals Christian School in Florence, Ala.

Others were impressed with the environmental restoration aspects of the mine.

'Having the students see all the different types of engineering being used in this operation was a rare and great opportunity for everyone.'

— Taylor Langford, instructor

"Having seen the worst of strip mining in the 1960s, I think Red Hills is an amazing facility," said Cathy Grace, staff geologist and coordinator of academic and administrative affairs. "I was glad the students were able to see a mining operation done beautifully from an environmental standpoint."

Zack Parchman, a junior civil engineering student from Amory, was also impressed with the environmental aspect of the project.

"I was amazed at how they transformed land depleted by the mining process into wooded forests and lakes," Parchman said. "Also, the fact that the processing plant where the coal is burned produces extremely low emissions is really cool."

Arin Jones of Columbus, a student at the Mississippi School for Mathematics and Science, said, "I found the way

Engineering 100 students begin a tour of the North American Coal Corp.'s Red Hills Mine and Power Plant. (Photos courtesy of Maxine Woolsey)

they use ash to build streets that are as strong as those made with concrete very interesting."

Taylor Langford, an Ole Miss engineering alumnus who teaches chemistry and physics at Lafayette County High School, said the trip was an excellent reinforcement of the subject matter he has been covering as an Engineering 100 instructor.

"As a teacher, I believe it's good to expose students to the practical applications of whatever it is we're talking about," Langford said. "Having the students see all the different types of engineering being used in this operation was a rare and great opportunity for everyone."

Students explore the Red Hills facility

In addition to Flippo, Huber and Jones, the other visiting high-school students enrolled in Engineering 100 were Bryan Hostetler of Rome, Ga., Chris Huber of Murfreesboro, Tenn., Jon Lalo of Brandon and Taylor Yates of Ridgeland.

For more information about the Summer College for High-School Students, call Jason Wilkins at 662-915-6614.

ENGR 100 welcomes new instructors

Introduction to Engineering (Engineering 100) is offered each summer to introduce high-school students to the field of engineering during the university's Summer College for High-School Students.

During the program, engineering upperclassmen teamed up with high-school students to enhance their engineering learning experiences. They served on panels to discuss engineering and shared knowledge from their particular engineering disciplines.

This year, Engineering 100 was led by two new instructors. Taylor Langford, who taught during the first session, teaches chemistry and physics at Lafayette High School and plans to include engineering projects in his physics classes there. Associate Professor John O'Haver served as co-instructor for that course.

Jim Hartsfield, who taught during the second summer session, has 30 years of experience as a manufacturing engineer with Emerson Electric and BorgWarner Automotive. He is an instructor in the Workforce Development Department at Holmes Community College in Grenada and Northwest Mississippi Community College in Senatobia. He is currently administering hiring screening tests for skilled employees for Toyota's new plants in north Mississippi.

Engineering 100 Instructor Jim Hartsfield (left) grades a coffeemaker project by student Landon Rone of French Camp in a chemistry lab this summer.

Taylor Langford (right), first session Engineering 100 instructor, helps student Nathan Flippo dismantle the surveying prism following a surveying demonstration.

Young engineers catapult ahead in trebuchet competition

The School of Engineering and the Mississippi Junior Academy of Science teamed up to sponsor and host the 2008 Catapult Competition held last spring.

More than 200 high-school students from around the state participated. Competing teams were judged on the design of their trebuchets—catapult devices used in the Middle Ages to hurl projectiles over masonry walls—and their hurling scores, which are based on distance, accuracy and height.

Following the competition, Scott Kilpatrick, assistant to the dean for recruitment and scholarships, and students from the Engineering Ambassadors program visited all of the participating schools to present trophies and certificates and to talk to classes about opportunities available to engineering students and graduates.

"These trebuchet competitions have become far more successful than I ever imagined," said Maxine Woolsey, education outreach specialist. "It has been extremely rewarding for me to see how the high-school and middle-school teachers and students have stepped up to this engineering challenge with such positive attitudes. And watching our engineering students conduct the competition has proven they understand the competition and are ready to take charge and make things happen."

High-school students from around the state gathered at UM to demonstrate their trebuchets.

High-school students introduced to engineering

The UM chapter of the Society of Women Engineers recently hosted the annual Introduce a Girl to Engineering Day for area high-school students. Visiting students met professors, attended engineering presentations, participated in lab demonstrations and toured Oxford and the Ole Miss campus.

A recent field trip to Sardis Lake and Dam, including a U.S. Army Corps of Engineers tour, offered Engineering 100 students insight into geology and geological, environmental and civil engineering.

Commencement 2008

Engineering awards 76 bachelor's, 46 master's, nine Ph.D.'s

The School of Engineering held its graduation ceremony on May 10 in the Lyceum Circle. In fiscal year 2008, 76 students received bachelor's degrees, 46 students received master's degrees and nine students received Ph.D.'s in chemical, civil, electrical, geological and mechanical engineering, as well as in computer and information science. The school ceremony was preceded by the universitywide ceremony held in the Grove.

photos by Harry Briscoe

James E. Banfield (BSME 08), who served as class marshal, receives his degree

Grady L. Cutrer (BSChE 08) and fellow graduates consider their accomplishments

Dean Kai-Fong Lee

Engineering faculty

Center for Manufacturing Excellence,
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mechanical engineering with an emphasis in manufacturing, and, to provide students with fundamental lean manufacturing and production techniques, the School of Business Administration and the School of Accountancy plan to offer minors in engineering.

"The manufacturing landscape has changed dramatically in recent years, and the university is adjusting its academic offerings to reflect that," Chancellor Robert Khayat said. "By offering these programs related to manufacturing, we are giving our students the skills they need to keep Mississippi attractive to businesses and are preparing our students to help us meet the challenges of a global marketplace."

The CME is thought to be one of only a few of its kind, said Dennis Cuneo, a former Toyota senior vice president and current Toyota consultant who led the team that selected the Blue Springs site.

Two locally based foundations have joined the effort to prepare Mississippi students to become industry leaders. The Robert M. Hearin Support Foundation in Jackson has pledged $750,000 over the next three years toward the center's creation, and the Mississippi Power Education Foundation has given $500,000. The Hearin Support Foundation is named for the late Jackson business leader and philanthropist. Mississippi Power is a Southern Company subsidiary that provides electricity to 190,000 customers in 23 counties in south Mississippi.

"With nearly 3,000 manufacturing firms employing 172,000 Mississippians, it's vital that we prepare our young people for leadership careers in this sector of the economy," said Anthony Topazi, president and chief executive officer of Mississippi Power. "From industries like automotive, chemicals and electric utilities such as Mississippi Power, there are many exciting manufacturing companies locating and growing in Mississippi, and they represent $12.9 billion of the state's gross domestic product.

"The Center for Manufacturing Excellence fills a need for manufacturers who are seeking qualified candidates to hire. Thus, its mission will improve the lives of the people of Mississippi."

Supporting the CME also furthers the Hearin Foundation's mission of supporting university programs in Mississippi that prepare students for successful careers, thereby improving the state's economy.

'The Center for Manufacturing Excellence will be a genuinely unique institution that generates engineering graduates who understand advanced manufacturing...'

— Jim Vaughan, interim director

"It will help enhance and further manufacturing excellence in Mississippi and beyond," Cuneo said. "Automotive and nonautomotive companies will benefit from the center. I salute Governor Barbour and Chancellor Khayat for taking such a positive step to help manufacturing thrive.

"We are happy to see the state so committed to advancing manufacturing. Some people assume that the manufacturing sector is in decline and is destined to move offshore. The creation of the center shows that the manufacturing sector is vibrant and growing in Mississippi, and will play an important role in the state's economy."

The Hearin gift will fund a Manufacturing Internship Program to link the university, the CME and state manufacturing firms. It is anticipated that the program will provide a gateway for the development of further relationships between the CME and the state manufacturing industry. In turn, these relationships will provide lasting benefits by helping to retain the state's best and brightest students to contribute to Mississippi's economic

development.

A major goal of the center is to produce and connect a continuous pool of highly qualified graduates likely to be hired by manufacturers as engineers, accountants, business managers and other professionals.

"The Center for Manufacturing Excellence will be a genuinely unique institution that generates engineering graduates who understand advanced manufacturing from a process/engineering perspective and from the business, management and leadership points of view," Vaughan said.

In addition to expanded academic opportunities, CME students will participate in internships or co-op work-study programs to gain hands-on industrial experience.

"By the beginning of their junior years, our students will be heavily involved in responding to real manufacturing design problems," Vaughan said. "By the end of their senior years, they will have mastered all of the skills that will make them attractive to industry both inside and outside of Mississippi."

Though definite plans have not been finalized, university officials hope to begin enrolling students as early as fall 2009, Vaughan said.

Other goals for the center are for it to serve as a resource for research and programs related to manufacturing, to train the state's manufacturing community and to collaborate with north Mississippi K-12 schools and community colleges.

For more information on the Center for Manufacturing Excellence, go to www.olemiss.edu/cme or contact Vaughan at 662-915-2631 or cme@olemiss.edu.

Class officers provide leadership

The Engineering Student Body supports the School of Engineering through regular fundraisers and events. This year's Engineering Student Body officers are Chris Turbeville of Southaven, vice president (left); Lauren Haney of Sandy Hook, president; and Josh Haskins of Senatobia, secretary/treasurer.

Questions about engineering? Ambassadors have answers

Engineering Ambassadors provide information on the engineering profession to prospective students and others unfamiliar with the field. 2008 Engineering Ambassadors, top row from left: Joey Parkerson, a senior chemical engineering major from French Camp; Virginia Naryka, a senior geological engineering major from Atlanta. Middle row from left: Casey Wilson, a senior chemical engineering major from Pontotoc; Will Virgo, a junior geological engineering major from Alpharetta, Ga. Bottom row from left: Steven Judson, a sophomore mechanical engineering major from Columbus; Lauren Haney, a senior civil engineering major from Sandy Hook.

photos by Nathan Latil

Lorena Lica and daughter Aryanna with Marni Kendricks

Civil Engineering Professor Waheed Uddin and Lorena Lica

Life Lessons

International student pursues citizenship, becomes mother, works toward degree

Today Lorena Maria Lica is a UM senior, a U.S. citizen and a new mom. But, just three years ago, Lorena Maria Lica was a typical Romanian university student. Having completed four years of her five-year environmental engineering program at a technical institute in Bucharest, the Romanian native anticipated completing her degree, opening her own business and eventually marrying and starting a family.

Then Lica went to a friend's wedding, and her life hasn't been the same since.

At the Romanian nuptials, she met Hugh Byrne "Trey" Phyfer III, a Mississippian 15 years her senior, whose job had sent him to Romania for a year. A casual introduction led to a whirlwind romance that continued after he returned to the states.

"We kept our connection over the Internet," Lica said softly as she smiled at the memory. "At some point he asked me if I wanted him to come back to Romania. At first I thought he was kidding, but he was totally serious. So I told him yes."

"I visited Lorena once a month for six months," Phyfer said. "One day, she asked me to marry her. I said yes."

Lica and Phyfer married in October 2006 in Romania. After she obtained her visa, the newlyweds moved to Mississippi and were remarried. Lica became a U.S. citizen last summer.

Coming to the United States in general and Mississippi in particular has been no small adjustment for Lica.

"One of the promises I made to Lorena's father and mother was that I would see that she got into a university and completed her degree," Phyfer said. "In order to be admitted, she had to first take and pass the TOEFL (Test of English as a Foreign Language) exam."

Although Lica is fluent in five languages (Latin, Spanish, Italian, French and German), she had never studied English. She learned to read and speak English entirely by listening to radio, watching television and having conversations with her husband.

Still, Lica and Phyfer said passing the TOEFL exam was not an easy task.

"The first time I took it last fall, I only missed passing by six points," she said. "I was so close."

Passing the TOEFL exam was important to Lica both personally and academically.

"Although Ole Miss accepted most of my transfer credits, the university could not allow me to take further classes in my major or to be given regular grades until I passed the test," Lica said. "I am a good student, so recognition of my A's and B's was extremely important to me."

Between the first and second time Lica took the TOEFL exam, she delivered her first child.

Lica continued her daily commute from their home in Pontotoc to UM's

Oxford campus right up until her due date. Their daughter, Aryanna, was born March 11. A week later, Lica was back in classes. She passed the TOEFL exam in April.

In addition to her educational pursuits, Lica still maintains all the duties of being a new wife and mother. A nanny keeps Aryanna during the day while Lica is in classes. Phyfer helps at night.

"I'm amazed every day by the things that she does," said Phyfer, a safety director for United Furniture in Okolona. "I don't know many men or women who could do what she's done."

"I've had to have patience or else I would lose my mind trying to do all this," Lica said thoughtfully. "I may get six hours of sleep on a good night. Still, I really, really love my husband and our daughter, so it's not that hard. We manage."

Lica's professors and associates find her achievements nothing short of remarkable.

"This lady has amazing determination to finish her civil engineering degree while managing to take care of their baby," said Marni Kendricks, assistant to the dean in UM's School of Engineering. "She really impressed me with an extraordinary resolve to accomplish her academic goals and plan for more time with her daughter. I have no doubt she will meet the challenge."

After graduating from the university in May 2009, Lica said she plans to earn a master's degree by spring 2010. After that, she hopes that she, Phyfer and Aryanna will return to Romania, where she wants to open her own environmental engineering company. Should things go according to plan, Lica's dreams will have come full circle.

From Generation to Generation

Endowment honors family of engineers

by Lindsey Phillips

To honor her father's dedication to UM, a commitment that has spanned four generations, Ann H. Gresham (49) of Indianola has given $100,000 to establish the George P. Hopkins Engineering Scholarship Endowment.

Scholarship recipients will be full-time freshmen pursuing degrees in engineering. Students from Sunflower County, where Indianola is located, and Harrison County, where Hopkins' hometown of Gulfport is located, will be given first preference.

"The School of Engineering is profoundly grateful for this gift from Ann Gresham," said Kai-Fong Lee, dean of the engineering school. "The amount of scholarship we can offer a student is an important factor in the student's decision of which university to attend. We have been blessed with the generosity of many donors, and the Hopkins scholarship will enhance the school's competitiveness in attracting outstanding students to The University of Mississippi."

George Hopkins

Gresham said she hopes the scholarship helps send deserving students to UM's School of Engineering, as it has played a large role in her family's life. After Hopkins earned his degree in civil engineering in 1917, his son, George P. Hopkins Jr. (BSCE 50), and great-grandson, George P. Hopkins IV (BSCE 08), also earned engineering degrees. Another great-grandson, Michael Gresham, is currently enrolled in the School of Engineering.

"We are big Rebel fans," Gresham said. "I mainly wanted this scholarship to be in memory of my father and to recognize his sons and grandsons who have pursued civil engineering. I just hope it will help smart, young engineers to go out into the world and be better citizens."

Hopkins, who died in 1964, was an avid follower of Ole Miss athletics, and he especially enjoyed attending football and baseball games. He was founder of Gulfport-based George P. Hopkins, Inc., a contracting and engineering company still in business and in the Hopkins family today.

Gresham's gift is part of the university's MomentUM Campaign, a four-year initiative to raise $200 million.

Funds raised through the campaign, which ends in December 2008, will support scholarships, graduate fellowships, faculty support, a basketball practice facility, residential colleges and a new law school on the Oxford campus. Also in the plans are a cancer center at the UM Medical Center and a new building to house the School of Pharmacy, both in Jackson.

Uncovering Climate Change

UM faculty cooperates for course on global warming

It was a major issue in Al Gore's presidential campaign in 2004. Two years later, it was the subject of an Oscar- and Nobel Prize-winning documentary. It continues to generate stories in the mainstream news media, getting blamed for many weather-related natural disasters and a growing number of endangered species.

Yet for all the attention it's getting, global warming remains somewhat of an enigma for many people. That's why University of Mississippi chemical engineering professor Wei-Yin Chen proposed and received approval to start a seminar course last spring examining climate change, including causes, impacts and solutions.

Sixteen graduate and undergraduate students enrolled in Engineering 597 last spring. In addition to Chen, 18 other UM faculty members and a Mississippi State University climatologist were instructors for the course. The professors' backgrounds included chemical engineering, chemistry, civil engineering, mechanical engineering, geological engineering, computational hydroscience, pharmacy, physical acoustics, biology, and philosophy and religion. Topics covered in the class included energy economics, ecological and health impact, energy conservation, nuclear energy, carbon sequestration, combination modifications, photocatalytic reduction of carbon dioxide, water spliting and effects of climate change on coastal floods. Chen said the course is expected to be offered again in the spring of 2009.

"The immediate goal of our activities is to raise awareness of the global warming issue," Chen said. "The second objective of this initiative is to consolidate an intellectual base at the university to help mitigate the effects of climate change."

Students who completed the spring course were thrilled with the opportunity to learn about global warming from so many perspectives.

"We learned so much because we had all these different experts come and offer their knowledge," said Benson Gathitu, an energy researcher graduate student from Limuru, Kenya. "This course is a great educator."

photo by Nathan Latil

Wie-Yin Chen

"The end point of the class—developing a way to alleviate global warming—is somewhat daunting," said Crystal Warren, an environmental toxicology graduate student from Collierville, Tenn. "Still, the knowledge provided from the various fields of professors is very beneficial."

Chen said lecture notes and slides from each presentation are available for public viewing at http://home.olemiss.edu/~cmchengs/Global%20Warming.

Beyond the course, Chen said seven campus research clusters are working individually and collectively on proposals related to global warming. He has been approached by a publisher to edit a book on climate change in 2009.

An affiliate of the International Workshop on Controlling Emissions of Green House Agents, Chen is vice president of the Overseas Chinese Environmental Engineers and Scientists Association. Plans for a workshop between U.S. and Chinese researchers and policy makers are pending.

"The United States and China represent two camps of distinctly different opinion about how to set the emission limits for different countries," Chen said. "We believe research collaborations between the two nations will be an essential step in moving the dialog forward."

Chen said as UM becomes internationally recognized as an expert on the subject of climate change, he anticipates it will eventually receive a substantial funding commitment for research from the U.S. government.

"Global warming is an issue that has been put on the low priority list long enough," Chen said. "Hopefully by collaborating with other researchers in the U.S., Europe and China we can proceed with finding solutions to the problem posed by greenhouse agents."

For more information, contact Chen at 662-915-5651 or cmchengs@olemiss.edu.

photo by Nathan Latil

MMRI's Brad Crafton fills a university van with biodiesel.

Campus lawn mowers running on biodiesel

If you find the air smells downright appetizing on The University of Mississippi campus this fall, then you might not be far from a lawn mower.

Landscaping Services is now operating all campus mowers on a mix of regular diesel and biodiesel fuel made from used cooking oil by research technicians at the UM Mississippi Mineral Resources Institute. The oil used to prepare food in the cafeteria may be the same stuff running the lawn mowers weeks later.

The fuel mixture is 20 percent biofuel and 80 percent regular diesel. This should cut the pollution created by campus lawn mowers as much as 50 percent, according to Brad Crafton, MMRI research technician. MMRI also runs a university van on a biofuel mixture, and Crafton usually runs his own 1980 Mercedes Benz on 100 percent biodiesel.

As the amount of biodiesel is increased in this diesel cocktail, the emissions actually smell more and more like what was originally cooked in the cooking oil. At 20 percent, however, the odor may appear relatively faint.

Seven Toro 328 industrial lawn mowers on campus are running on the fuel, said Jeff McManus, landscaping director. The landscaping crew is also experimenting with applying this use of biodiesel to small-engine machinery such as weed trimmers and blowers.

Besides the environmental benefits, this new fuel is proving to be financially beneficial to the university.

This summer, they successfully tested using the fuel mixture to run a mower and a weed trimmer.

Besides the environmental benefits, this new fuel is proving to be financially beneficial to the university.

"We've found in the first week [the mowers] actually use more fuel," McManus said. However, the cleaner-burning fuel actually cleans the engine, and, after a cleansing period, the engines run more efficiently, Landscaping Services staff have observed.

Between July 14 and Aug. 4, a mower running on regular fuel burned 2.25 gallons an hour compared with 1.2 gallons per hour using the biofuel mixture while doing approximately the same job. The regular fuel mower ran 63.3 hours in two weeks and burned 52.6 gallons of diesel; the biofuel mower ran 90.2 hours and burned only 40 gallons of fuel.

Actual savings, which will include savings on engine maintenance due to the cleaner-burning biofuel, are still being determined. The department usually spends $3,000 on fuel for mowers every two or three weeks, said David Hodge, chief mechanic.

McManus has ordered decals for the biofuel mowers to indicate they operate on environmentally friendly fuels. He estimates that, after a year of operation, the department can increase the mixture to 50 percent biodiesel.

Supply will determine the extent of the biodiesel project, but Crafton is confident he can keep the fuel pumping as needed. He is running a small-batch operation in which he produces around 100 gallons of fuel per week to mix with the regular diesel. He said he can produce the fuel for about a dollar a gallon. The cooking oil comes from local restaurants and campus locations, including cafeterias and fraternity houses.

"Usually they pay to have this stuff hauled away," he said. "This way, they save a bill, and I save a bill."

This move comes less than four months after Chancellor Robert Khayat signed the American College & University Presidents' Climate Commitment. Sponsored by the Association for the Advancement of Sustainability in Higher Education, the initiative calls for colleges and universities to reduce their greenhouse gas emissions over the course of five years.

Alice Impresses Teachers

3-D animation software speaks to state's schools

Two years after her debut at The University of Mississippi, Alice is "graduating" to elementary, middle and high schools across the state.

Alice, educational software that teaches computer programming in a 3-D environment, was introduced to UM students enrolled in the Survey of Computing course in fall 2006. Soon the programming system, which was developed at Carnegie Mellon University, became a favorite with computer science majors and nonmajors alike.

The program's success at UM led the National Science Foundation to grant Mississippi three weeklong workshops to train 22 public and private school teachers statewide to use the program.

This speaks well for the state, said Mary Wroten, science specialist at the Mississippi Department of Education. Wroten visited the first workshop held in June at UM.

"I'm so pleased to be able to observe teachers from various grades and disciplines already using the Alice program after only three days of training," Wroten said. "Mississippi lags behind other states in many areas; however, it has been selected as one of only six states for the NSF grant to offer professional development training in Alice. This is a wonderful way to provide experiences that enhance skills in logic, problem solving and real-world connections for our teachers and students."

The training prepares the teachers to implement Alice in their classrooms and for special projects at their schools this fall. The workshops, which were all held at UM during the summer, were made possible through a $1.3 million National Science Foundation ITEST grant (Grant No. 0809853) to Stephen Cooper at St. Joseph's University. Cooper, associate professor of mathematics and computer science at SJU and an NSF program director, is a co-instructor for the workshops.

photo by Robert Jordan

Area teachers introduced to Alice included Brenda Spearman, Saltillo High School (left); Miriam Rone, Oxford Middle School, and Martha Jones and Monte Ewing, Columbus School District.

"This is our first effort to take Alice instruction from the college setting back to secondary and elementary schools," Cooper said. "Hopefully, if this proves successful, Mississippi will be leading the rest of the country in incorporating Alice at this level nationwide."

The Alice system was developed by Randy Pausch, the professor of computer science at Carnegie Mellon who died this year of pancreatic cancer after becoming famous for his speech, *The Last Lecture*. Pausch also co-authored the textbook *Learning to Program with Alice* (Prentice Hall, 2006) with Cooper and Wanda Dann, associate professor of computer science at Ithaca College and co-instructor for the workshops.

Like the UM students introduced to the programming system two years ago, workshop participants responded positively to the training.

"I've never worked with a group of teachers as excited as this one," said workshop coordinator Maxine Woolsey, educational outreach specialist for the UM School of Engineering. "Discussions are lively, and everyone is so enthused about what they are learning that they don't seem to mind the daily eight hours of rigorous instruction."

The teachers are expected to carry their enthusiasm back to their classrooms this fall to teach the program, which is ideal for intellectually astute students who may not receive the mathematical background required to major in computer science at the university level, said Pamela Lawhead, associate professor of computer and information science and an instructor for the workshops.

"Interacting with Alice's animation and sound, users quickly become engaged in creating their own films and games; it's learning in disguise," Lawhead said.

Leader in his Field

UM honors engineering professor with unique award

Sam Shu-Yi Wang, F.A.P. Barnard Distinguished Professor of Mechanical Engineering at UM, has a list of achievements and awards that spans four decades, six continents and dozens of organizations.

Another was added last May during UM's commencement ceremonies, when he became the inaugural recipient of the university's Distinguished Research and Creative Achievement Award.

"This award was created to recognize and pay tribute to a faculty member whose career and achievements have generated national and international accolades, someone who has been a leader in his chosen field, and someone who has made outstanding, lifelong contributions to his profession and to our institution," said Alice M. Clark, vice chancellor for research and sponsored programs.

"We are so grateful for Dr. Wang's leadership on this campus and his impact globally. We are also grateful to Pharmaceutics International Inc. for providing a gift in support of this award."

Wang, founder and director of UM's National Center for Computational Hydroscience and Engineering, is the only scholar in the world to win the two highest honors in the field of erosion and sedimentation research: the American Society of Civil Engineers' Hans Albert Einstein Award and the Qien Ling Award for Outstanding Achievement from the World Association for Sedimentation and Erosion Research.

Wang joined the university's faculty in 1967. During his tenure, he has published and presented more than 300 original research articles and edited 10 books. Recognized worldwide in his field, he has been an invited keynote speaker and an expert consultant and special lecturer to governments, institutions and professional societies in more than 30 countries.

photo by Nathan Latil

Alice Clark presents Sam Shu-Yi Wang with the Distinguished Research and Creative Achievement Award

"I would like to share this high honor with all of my colleagues at NCCHE," Wang said. "With the strong support of the dedicated, capable and hard-working research scientists there, we proved convincingly that complexities and difficulties in hydroscience research can be overcome."

Wang also credited his successes to the continuing support he has received from the university and his beloved wife, Jine. "Without her understanding and support, I would not be able to concentrate on my hard work for long hours each day, often seven days a week," Wang said.

A fellow of the American Society of Civil Engineers, Wang is a founder of the Environment and Water Resources Institute and the World Association for Sedimentation and Erosion Research. Admired and respected by his peers, he is also an associate fellow, honorary member, member and/or officer of more than 10 professional societies.

Wang conducts and directs basic and applied research projects in the field of computational hydroscience and engineering supported by many federal and state agencies. He has attracted research grants and awards totaling more than $20 million.

"Dr. Wang is one of the most outstanding researchers and teachers that I have come across in my long career," said Kai-Fong Lee, dean of the UM School of Engineering. "His former students have given testimonials that the outstanding teaching and guidance they received from him have been instrumental in their success in their careers."

Encouraging Engineering

Alum gives $321,000 to create scholarship endowment

For 93 years, University of Mississippi alumnus Harper Johnson (39) has watched the world change. He remembers the locomotives that carried him to Oxford in 1935 to enroll at the university, and he recalls the building of the highways that Ole Miss students travel today. He saw the birth of radio, then television, and he laughs now at the memory of a professor who told him both were fads. Behind every change he has seen, Johnson has seen something else: engineers.

Johnson had a successful career as an electrical engineer and made his home in Greenwood. Now, he hopes to help other young men and women enjoy similar opportunities. He and his late wife, Elsie, have given $321,000 to Ole Miss to create the Elsie and Harper Johnson Jr. Scholarship Endowment in the School of Engineering.

Johnson is a member of UM's 1848 Society, which recognizes alumni and friends of the university who have either funded or planned a deferred gift, such as a bequest or a life income plan.

"Mississippi in general is starving for engineers," Johnson said. "Without engineers we're not going to grow. I want to encourage students from Mississippi to stay in the state. To keep students in Mississippi, you've got to have something for them."

The Johnsons' scholarship will be awarded to full-time electrical engineering students from Leflore or Tate counties.

"What Elsie and Harper have done is exactly what the state of Mississippi, and small towns especially, need," said Floyd Melton Jr., an attorney in Greenwood and a friend of Johnson's. "The goal of this scholarship is to see kids take the hard courses, become engineers and come back into our communities to work and live."

Harper and Elise Johnson

The son of a lawyer and grandson of a judge and a doctor, Johnson said he never had any plans to enter the family professions. "Mississippi has enough lawyers and doctors," he joked.

Early in his life, it was the shop next door to his father's law office in Senatobia that intrigued Johnson most. The store specialized in leatherwork, and he spent many hours there, marveling at how things were made and observing how they worked. When he boarded a train bound for Ole Miss, he knew engineering was his calling. Johnson was a quick learner, excelling even in the tough subjects. "Studying engineering was fun for me," he said.

Although Johnson had come to Ole Miss to study electrical engineering, just a year into his schooling, the university dropped its electrical engineering courses. Johnson left Oxford and took a job in Greenwood with Supreme Instruments, a company that produced instruments for servicing radios. Johnson worked at Supreme for one year before heading to Fort Wayne, Ind., to finish his degree at Indiana Institute of Technology, then one of the top engineering schools in the country.

With his diploma in hand, Johnson returned to his job in Greenwood with Supreme Instruments, eventually working his way up to head of the service division. After a stint in the Army Signal Corps during World War II, Johnson went back to Greenwood and to Supreme, where he met Elsie, and they married in 1946. When Supreme was bought by Hickok in 1956, Johnson took a job with Greenwood Utility, working there until his retirement in 1980. Johnson also helped bring MathCounts, a national math enrichment program founded by the National Society of Professional Engineers, to Greenwood's middle schools during his career.

The gift is part of the university's MomentUM Campaign, a four-year initiative to raise $200 million. The campaign, which ends in December 2008, provides funds for scholarships, graduate fellowships, faculty support, a basketball practice facility, residential colleges and a new law school on the Oxford campus. Also in the plans is a cancer center at the UM Medical Center in Jackson.

'I want to encourage students from Mississippi to stay in the state. To keep students in Mississippi, you've got to have something for them.'

— Harper Johnson

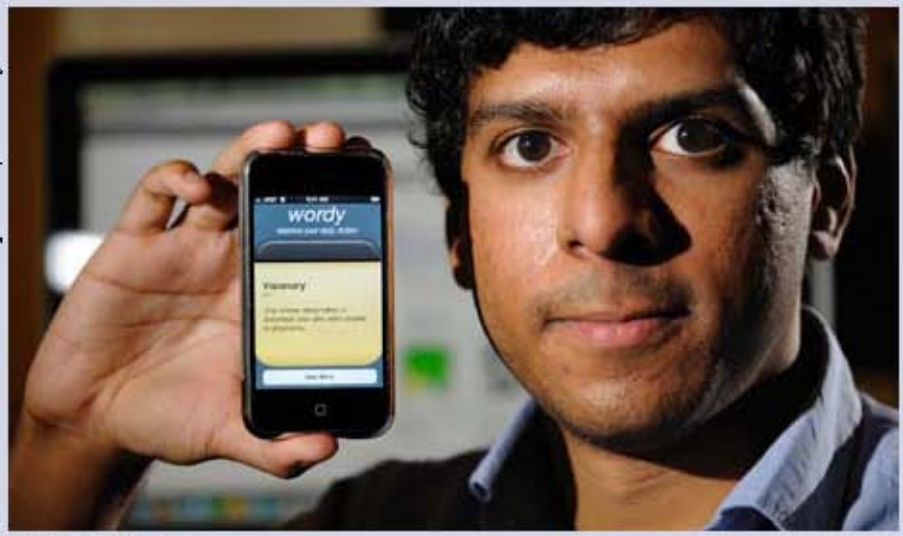
Student's applications featured on iPhone

Since the new iPhone 3G launched this summer, senior Deepak Mantena of Oxford has been seeing dollar signs. People have come out in droves to buy the phone and to download four software applications designed by The University of Mississippi computer science major.

Mantena is among 4,000 software developers selected by Apple following a worldwide search begun last spring. His downloads are available in the App store, at the iTunes Web site or directly from an iPhone.

"I received the good news in May from Apple," Mantena said. "It is really exciting to have been selected."

photo by Robert Jordan



Deepak Mantena

Mantena's software includes "Chores," a to-do list application; "Wordy," a program that helps expand a person's vocabulary; "Gratuity," a program that tabulates tips; and "Fright," which offers scary scenes and sounds. "Chores" costs $4.99, and the others are available for 99 cents each.

"Once you pay the one-time application fee, you will receive routine updates of your product," Mantena said.

The self-professed computer geek, who started his own software company, TapeShow, last fall, has been featured in the business sections of *The Clarion-Ledger* and the *Los Angeles Times*. He has noticed a considerable increase in business since the release of the iPhone 3G.

"It is great to show growth, being an independent businessman," he said.

Mantena's efforts to create Apple software began in March. For the competition, more than 200,000 people downloaded Apple's development software, and the computer manufacturer received 20,000 applications.

The self-professed computer geek, who started his own software company, TapeShow, last fall, has been featured in the business sections of The Clarion-Ledger *and the* Los Angeles Times.

"I wish I had the maturity, forethought and energy to do what Deepak did," said Dawn Wilkins, associate professor of computer science. Mantena created the "Chores" program in her independent study class.

"He's a real go-getter who has so many ideas. He has to filter which ones will work best for him. When you have a student on Deepak's level, you find yourself trying to find new ways to challenge him."

Drawn to computers at an early age, Mantena has always known he wanted a career in the computer science field. "Instead of watching TV, I was always on the computer," he said.

Mantena works as a consultant when he is not working at the university's National Center for Computational Hydroscience and Engineering, where researchers develop new computational models and engineering tools to simulate water flows, sediment and pollutant transport, soil erosion and flood damage.

Math and science are in the Mantena family's blood. Dad, Raju, is a UM mechanical engineering professor. Mom, Veena, works in the university's financial aid office. Mantena's older brother, Ravi, works as a computer engineer in the Seattle area and his younger brother, Nitin, is an Ole Miss pharmacy major.

Beyond his growing success, Mantena finds time to enjoy photography, the outdoors, making short films and playing in a band.

Mantena plans to graduate with a bachelor's degree next spring and to attend graduate school at the University of Washington. After completing his master's degree in computer science, he believes the sky will be the limit.

"I've got plenty more ideas for applications in development," Mantena said. "I want to be making software for the rest of my life."

For more information about Mantena's company, visit www.tapeshow.com.

Geo-engineers teach high-tech disaster preparation

A University of Mississippi team of geological engineers continues to train people from around the globe in the use of high-tech equipment to map their countries' populations and regions in preparation for natural disasters.

Greg Easson, chair and associate professor of geology and geological engineering, develops and tests field-mapping solutions for disaster preparedness and mitigation in developing countries. Since 2006, Easson and UM students have traveled to El Salvador and Brazil to assist World Vision, an international Christian relief and development agency, with plans to develop a geographic information system database in those countries.

Most recently, the UM team conducted two two-day sessions at the World Vision Development Office in Mexico City. Approximately 25 workers from Mexico, Nicaragua, El Salvador and Honduras participated.

A joint venture between UM and World Vision, the project called for gathering information in Mexico City, including GIS data, funneling it through an Internet mapping site at UM and then making it available to World Vision for use in creating maps illustrating present conditions as well as possible scenarios following a disaster.

Igor Jaramillo (MS 04) teaches a participant at a LumiMap training session to use a Trimble handheld GPS unit.

"Using the LumiMap technology, we were successful in collecting data and making it available on the server within 12 hours," Easson said. "On this trip we only had four days for training which meant less time for field work."

Easson was accompanied by geological engineering research assistants Justin Janaskie of Hot Springs, Ark., and Emily Woolsey of Oxford. Igor Jaramillo (MS 04) also assisted in the training. The students found their trip to Mexico City to be an eye-opening experience.

"The hospitality of the people in Mexico is always outstanding," Janaskie said. "Mexico City is a sprawling urban area with a population of more than 20 million people. The training helped to reinforce the idea that disasters are not only limited to rural areas but also occur in large urban areas."

Easson said the workshops were conducted after rains flooded the Tobasco region of Mexico.

"Tropical storms and rains cause floods around that time, which provided ample opportunity to see exactly how effective this technology really is during a natural disaster," he said.

Civil engineering chair spotlighted on ScienceWatch.com

A University of Mississippi civil engineer was featured in the March edition of a prestigious Web site that tracks trends and performance in basic research.

Alexander H.D. Cheng, chair and professor of civil engineering, appears in the Fast Moving Fronts section of ScienceWatch.com by Thomson Scientific. Thomson Scientific owns the Science Citation Index and the Web of Science online citation database.

Cheng's interview focuses on the growing popularity of his article, "Exponential convergence and H-c multiquadric collocation method for partial differential equations." Since its publication in 2003, the paper has been highly cited by other researchers in the mathematics field. A follow-up paper, "Error estimate, optimal shape factor, and high precision computation of multiquadric collocation method," was published in 2007.

Cheng said engineering and science problems are often expressed in the form of mathematical equations known as partial differential equations. While the goal is to solve these equations accurately and efficiently, the full realization of such accuracy was blocked by the computer's inability to carry enough digits in the computation.

"Our work overcame this issue, and

Woolsey, *continued from Page 3*

In an era when most geologists have become specialists, Woolsey's broad range of expertise allowed him to work on a diverse range of projects, said Terry Panhorst, UM assistant professor of geology and geological engineering, who had known Woolsey since joining the faculty in 1996.

"He was an old-style geologist, the kind that is hard to find these days," Panhorst said. "His experiences took him around the world, and, because of his broad range of expertise, he could talk with anybody."

'He was as comfortable sitting on the front porch of a house in Belize chatting with people as he was in a meeting here on campus or in Washington, D.C.'

— Terry Panhorst

Woolsey was an ASW patrol plane commander and test pilot for the U.S. Navy Reserve, where he worked primarily in anti-submarine warfare. A 1959 graduate of Mississippi State University, Woolsey studied ocean science and engineering at the U.S. Navy Postgraduate School and earned his doctorate in geology in 1977 from the University of Georgia. There, he met and roomed with fellow graduate student Jesse Hunt, and they maintained a friendship for more than 40 years as their careers took parallel paths.

Hunt, a geologist in the Resource Studies Unit of the U.S. Department of the Interior's Minerals Management Service in New Orleans, was the contract inspector for the seafloor observatory Woolsey helped develop to study hydrate deposits about 100 miles south of the Mississippi coast.

"He was an incredible person," Hunt said. "There wasn't anything he couldn't do. I've never met anyone more knowledgeable and flexible than Bob. If there was a specialty welding job that nobody else could handle, Bob would put on the welding gloves and do it himself."

Before joining the UM faculty in 1980, Woolsey worked as a contractor for private industry and the United Nations, specializing in marine minerals resources and related environmental engineering projects. His work focused on alluvial tin, gold and diamond dredge mining in Southeast Asia and South America, and on industrial minerals in the Mediterranean Sea, South Pacific Ocean and Africa.

Woolsey often entertained friends and colleagues with stories of work in the jungles of Africa and South America. Friends marveled at his ability to converse with people from all walks of life, said Panhorst, who accompanied Woolsey on a research trip to Belize in 2005.

"He was as comfortable sitting on the front porch of a house in Belize chatting with people as he was in a meeting here on campus or in Washington, D.C.," Panhorst said.

Woolsey was an Eagle Scout, a Mason and a member of Oxford-University United Methodist Church. He received an honorary doctorate from the Moscow Mining Institute.

Survivors include his wife, Maxine Woolsey of Oxford; two daughters, Deirdre Ellis of Sterling, Va., and Emily Woolsey of Oxford; five sons, Nathan Woolsey of Milton, Fla., Ben Woolsey of Kailua, Hawaii, Stephen Woolsey of Pittsburgh, and Max Woolsey and Joe Woolsey, both of Oxford; and four grandchildren. He was preceded in death by his parents, James Robert and Virginia Woolsey, and a brother, David Woolsey.

The family requests that memorials be sent to the J.R. Woolsey Geology and Geological Engineering Memorial Scholarship, c/o The University of Mississippi Foundation, P.O. Box 249, University, MS 38677.

we have discovered one of the most accurate numerical methods," Cheng said. "There is still a long way to go to make it as competitive and popular as the finite element method, but I believe that it will one day become an important branch of numerical methodology, one that offers scientific and engineering solutions that contribute to the long-term sustainability of humanity."

Application of the multiquadric collocation method in solving many engineering problems is needed, and software development will be the key factor leading to widespread industrial use, Cheng said.

Cheng received the 2007 Outstanding Engineering Faculty Member Award for his excellence in classroom teaching, scholarly research and professional service. His 2005 article, "Heritage and early history of the boundary element method," was the most downloaded paper for two quarters in 2005 in the computational engineering category, according to Elsevier's ScienceDirect.

"Citation by peers is an important measure of the impact of one's research," said Kai-Fong Lee, engineering dean. "The School of Engineering is proud that one of Dr. Cheng's research papers has made an important contribution in the numerical solution of partial differential equations, upon which many practical engineering problems are formulated."

To view Cheng's interview in ScienceWatch.com, visit http://sciencewatch.com/dr/fmf/2008/08marfmf/08marfmfHCheng.

Under the Sea

MMRI technology enables underwater exploration

The Mississippi Mineral Resources Institute is a leader in developing and expanding the capabilities of marine surveying and observing systems.

MMRI and the University of Southern Mississippi operate and enhance the Eagle Ray AUV (autonomous underwater vehicle). The vehicle is equipped with state-of-the-art mechanical, electrical and computational systems. Through its Seabed Technology Research Center, MMRI is charged with conducting at-sea deployment activities and developing new technologies for use on AUVs.

MMRI has developed precision seafloor sampling techniques that combine high-resolution, AUV-acquired seafloor maps with ultra-short base line (USBL) acoustic transponders and differential GPS technology to pinpoint areas of high interest. In this photo, MMRI's 10-meter core barrel equipped with a USBL transponder recovers gas hydrates from a cold seep site in the Gulf of Mexico.

A new robotic vehicle developed by MMRI to install a seafloor observatory was successfully deployed on three cruises in 2007. The vehicle is remotely operated by a fiber-optic cable and can operate safely at ocean depths. The vehicle was designed to make and break underwater connections and to deploy and recover seafloor arrays and experiments.

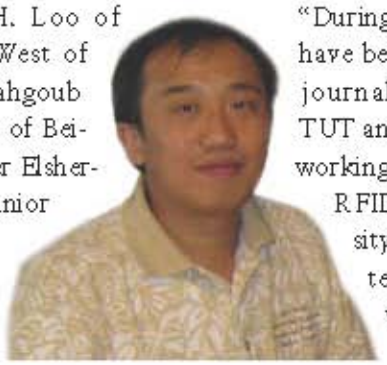
Funding awarded for RFID system, reflectarray antenna

Atef Elsherbeni conducts RFID research at Tampere University of Technology in Finland.

The scientific research collaborations of two University of Mississippi electrical engineers are proving to be both productive and lucrative.

Since 2004, Atef Elsherbeni and Fan Yang have been researching radio-frequency identification (RFID) systems and the creation of a single-layer reflectarray antenna with triple-band applications. Elsherbeni is the principal investigator on the RFID project, while Yang is spearheading the research on the reflectarray antenna. Together, the researchers have applied for grants totaling more than $3 million from NASA and other agencies.

Two other UM engineering professors, Ahmed Kishk and Darko Kafez, are also collaborators in the research. The team is assisted by engineering graduate students H. Loo of Memphis, Chasidy West of Oxford, Khaled Elmahgoub of Egypt and Ang Yu of Beijing. Sophomore Tamer Elsherbeni of Oxford and junior Safa Hadi of Egypt are also assisting.



Fan Yang is spearheading research on the reflectarray antenna.

The RFID research began in 2005, when Elsherbeni and Yang met with a group of RFID researchers from Tampere University of Technology in Finland. The meetings led to a proposal that received an $8,000 faculty research grant from the university in 2006. Cytec of Jackson awarded the project a $200,000 grant a year later, and DTI of Jackson gave the project another $300,000 this year.

"Radio-frequency identification is used in all areas of automatic data capture where it allows contactless identification of objects using radio-frequency signals," Elsherbeni said. "Typical applications of RFID technology include contactless payments, asset tracking, plane tickets, passports and product authentication."

Elsherbeni cited several advantages of RFID including long-range read; fast and accurate multiple-tag identification; read and write capabilities; security; and the ability to track people, items and equipment in real time.

"During the past three years there have been many conferences and journal publications between TUT and UM. Ultimately, we are working to establish a center for RFID research at the university, where our focus will be teaching, research and service," Elsherbeni said.

Yang's reflectarray antenna research also started two years ago with a $25,000-per-year award from NASA. Yu and Tamer Elsherbeni, along with engineering graduate students Matthew Inman of Oxford and Bhavari Devireddy of India, and Yang Hyo Kim (BS 07) of South Korea, are assisting with the project.

Yang said reflectarray antenna applications are primarily used in long-distance communication, such as satellite communication. The university team is working closely with the Jet Propulsion Laboratory at the California Institute of Technology in Pasadena, Calif., on the antenna, which has many possible applications.

"The advantages of the reflectarray antenna are that it is easy to maintain the flatness of the surface, it is lightweight and has small stowage volume, it's readily mountable on many existing structures and it provides wide-angle beam scanning when active elements or devices are used," Yang said. "The limitation of the reflectarray is that it generally has a narrow bandwidth due the element bandwidth and spatial phase delay."

Yang said the UM team's objective is to design a tri-band reflectarray antenna printed on a single-layer substrate.

"So far, the C-, X- and Ka-band elements are designed, making the coupling effect of the different elements feasible," Yang said. "A prototype antenna is being fabricated, and initial measurements suggest good design performance."

Great Chemistry

ChE alum receives prestigious Kroll Zirconium Medal

Take an ambitious high-school graduate. Add a rigorous chemical engineering degree program at The University of Mississippi. Mix in more than three decades of outstanding professional and research activity in the chemical process industry.

Combine these elements and you have B.J. "Billie" Sanders, the most recent recipient of the prestigious W.J. Kroll Zirconium Medal.

Sanders (BSCHE 60) is the 26th person to be honored with the award. His selection is in recognition of his extraordinary work in identifying and describing uses of zirconium alloys in the chemical process industries, especially in the acetic acid industry. "When I first learned of being nominated for the Kroll award, I was shocked," Sanders said. "I am the first from the chemical process industry to receive the award, and I am deeply honored."

Sanders said the global demand for acetic acid is around 14 billion pounds per year, with methanol carbonylation technology accounting for nearly 90 percent of the new production. "This technology was invented and commercialized by Monsanto Company during the late 1960s and early 1970s. Zirconium alloys have evolved as the material of choice for containing the very corrosive process streams," he said.

A native of Sweeny, Texas, Sanders received a Navy ROTC scholarship and knew that he wanted to be an engineer. Accepted for admission at numerous universities, he chose UM for its challenging chemical engineering program.

After earning his bachelor's degree from the university, Sanders became a Registered Professional Engineer in Texas. For 36 years he served at Monsanto Company and Sterling Chemicals until his retirement in 1996.

This year's W.J. Kroll Zirconium Medal recipient B.J. Sanders (center) with 2005 recipient Malcolm Griffiths of AECL Chalk River Laboratories (left) and 2006 recipient Richard Holt of Queens University in Kingston, Ontario.

"In the chemical process industry, corrosion mitigation and process containment is a major issue," Sanders said. "I was instrumental in developing corrosion performance data and fabrication techniques for zirconium resulting in growth of its use from a few bolts in the first plant to about 350,000 pounds in the latest plant."

He was also intimately involved in developing operation and maintenance procedures, training manuals, procurement specifications, inspection requirements and licensing requirements for the new process plants. By the time he retired in 1996, he had become renowned for his knowledge of the use of zirconium in chemical processes. He and his son, also a chemical engineer, continue to work with zirconium and other reactive metals through their consulting firm B.J. Sanders and Associates Inc.

'I am the first from the chemical process industry to receive the award, and I am deeply honored.'

— B.J. Sanders

Sanders has fond memories of Ole Miss.

"My experience was wonderful," Sanders said. "I entered in the fall of 1955 when Ole Miss was the dominant football team in the SEC, winning a few national championships while I was there. They were named the SEC team of the decade for the 1950s."

Sanders recalls a few of his classmates who, like himself, accomplished great achievements in their fields.

"I shared a post office box with Mary Ann Mobley—Miss America 1959. A Chi Omega sorority sister, Linda Lee Mead, was crowned Miss America in 1960," said Sanders, who was a member of Kappa Sigma fraternity. "I had

several classes with Tom Lester, best known for his role as Eb Dawson on 'Green Acres.' I also had naval science with Sen. Thad Cochran."

Sanders said his freshman-year dorm managers were fellow Navy ROTC and chemical engineering majors Paul Murrill (BSCHE 56) and Jess Woods (BSCHE 56). Murrill later became president of Louisiana State University and Ethyl Corp., while Woods became a Rhodes Scholar and was hired by Admiral H.G. Rickover, inaugural recipient of the Kroll award, as his assistant.

Two emeritus chemical engineering professors, Frank Anderson and Russell Aven, still reside in Oxford and remember Sanders well.

"Billie Sanders was probably a B+ student, but he was a very hard-working individual," Anderson said. "I'm extremely proud to learn of his accomplishments."

"He [Sanders] was one of my very first students, and I remember him as being quite excellent in academics and in character," Aven said. "I expected he would become an exceptional engineer one day, and it pleases me to know he has done just that."

Sanders and his wife, Mary Lynn, have three daughters, Cynthia, Beverly and Kimberly; a son, Blaine; and nine grandchildren.

Take an accomplished, retired chemical engineer. Add an illustrious career peppered with numerous awards and honorable recognition. Mix in a loving family, the admiration of colleagues and a supportive alma mater.

"That's what I call great chemistry," Sanders said.

Engineers earn distinction

James G. Vaughan (left), F.A.P. Barnard Distinguished Professor of Mechanical Engineering and interim director of the Center for Manufacturing Excellence, was recently named the 2008 Outstanding Engineering Faculty Member of the Year. Jerry M. Harris (right), director of the Center for Computational Earth and Environmental Science at Stanford University, received the 2008 UM Engineer of Distinction Award.

Professors author new textbooks

Two professors in the School of Engineering recently wrote or co-wrote new textbooks in their areas of expertise.

Computational River Dynamics (Taylor and Francis, UK, 2007) was written by Weiming Wu, research associate professor at the National Center for Computational Hydroscience and Engineering. Primarily intended as a reference for river scientists and engineers, it also serves as a textbook for civil engineering graduate students.

Organized into 12 chapters, it is one of the first books to present a complete picture of the physical principles and numerical methods used in computational river dynamics. The volume covers fundamentals of flow and sediment transport in rivers and includes many engineering applications, such as reservoir sedimentation, channel erosion, channel widening and meandering, local scour around in-stream hydraulic structures, vegetation effects on channel morphodynamic processes and cohesive sediment transport.

Alexander H.D. Cheng, chair and professor of civil engineering, is co-author of *Trefftz and Collocation Methods* (WIT Press, 2008). Unlike the finite-element and the finite-difference methods, the discretization and approximation of the collocation method detailed in the book is based on a set of unstructured points in space. This "meshless" feature is attractive because it eliminates the bookkeeping requirements of the element methods.

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Front row from left: Joey Parkerson, Will Virgo and Steven Judson. Back row from left: Casey Wilson, Virginia Naryka and Lauren Haney.

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_____ X-large	x	$30	= _____	❑ men's	❑ women's	❑ red	❑ navy	❑ white
_____ XX-large	x	$32	= _____	❑ men's	❑ women's	❑ red	❑ navy	❑ white
		Total	= _____	(price includes shipping and handling)				

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